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| 09/447,400 | 11/22/1999 | DAVID T. CHEN | CE08051R | 3769 |

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| EXAMINER |
|---|
| BAUGH, APRIL L |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2143 | |

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.     2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-14_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-14_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on _12 November 2002_ is: a)☒ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

| | | | |
| :--- | :--- | :--- | :--- |
| 1)☐ Notice of References Cited (PTO-892) | | 4)☐ Interview Summary (PTO-413) Paper No(s). _____ . |
| 2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | | 5)☐ Notice of Informal Patent Application (PTO-152) |
| 3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | | 6)☐ Other: . |

## DETAILED ACTION

### *Response to Amendment*

After applicants request for reconsideration, claims 1-14 are now pending.

### *Drawings*

1.    The proposed drawing correction and/or the proposed substitute sheets of drawings, filed

on November 20, 2002 have been accepted. A proper drawing correction or corrected drawings

are required in reply to the Office action to avoid abandonment of the application. The correction

to the drawings will not be held in abeyance.

### *Response to Arguments*

Applicant's arguments with respect to claim 1-4 have been considered but are moot in

view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

1.    The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.      Claims 1-4, 7, 8, and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable

over U.S. Patent 6,078,943 to Yu in view of Smith.

Referring to claim 1, Yu teaches in a communication system network having a plurality

of servers (Fig. 1, reference 54 of Yu), each of said plurality of servers having a load level based

on serving a number of clients in said communication system network (column 1, lines 10-11 of

Yu), a method comprising the steps of: grouping said plurality of servers into a first and second

server groups (column 4, lines 52-53 of Yu), wherein said first server group has a load level less

than load level of said second server group (column 3, lines 53-55 of Yu); calculating a time

period T (column 3, line 1 of Yu); assigning load to a server selected from servers in said first

server group from an initial time until expiration of said time period T (column 2, lines 58-60 of

Yu).

Yu does not teach to assign load to a server after time T. Smith teaches assigning load to

a server selected from servers in said first and second server groups after expiration of said time

period T (see column 14, lines 43-47 and column 15, lines 15-18). Therefore, it would have been

obvious to one having ordinary skill in the art at the time the invention was made to further

modify the method and apparatus for dynamic interval-based load balancing of Yu by assigning

load to a server from the first and second server groups after time T because to implement load

balancing there must be an interval of time for each server group where all servers within that

group are assigned a load.

Regarding claim 2, Yu teaches in a communication system network having a plurality of

servers (Fig. 1, reference 54 of Yu), each of said plurality of servers having a load level based on

serving a number of clients in said communication system network (column 1, lines 10-11 of

Yu), a method comprising the steps of: grouping said plurality of servers into a plurality of

server groups G0 through G2 (column 4, lines 52-53 of Yu), wherein server groups G0 through

G2 respectively have load levels progressively from a least amount of lead level to a most

amount of load level (column 3, lines 53-55 of Yu); calculating a time period T1 (column 3, line

1 of Yu); assigning load to a server selected from servers in said server group G0 from an initial

time until expiration of said time period T1 (column 2, lines 58-60 of Yu).

Yu does not teach of multiple time periods or how to assign load to a server during time

periods other than the initial time period. Smith teaches calculating a time period T1 and T2,

wherein said time period T2 is longer than said time period T1; assigning load to a server

selected from servers in said server groups G0 and G1 after expiration of said time period T1;

assigning load to a server selected from servers in said server groups G0, G1 and G2 after

expiration of said time period T2 (see column 14, lines 43-47 and column 15, lines 15-18).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to further modify the method and apparatus for dynamic interval-based load

balancing of Yu by having multiple time periods and assigning load to a server from each server

group during each time period after the initial time period because to implement load balancing

there must be an interval of time for each server group where all servers within that group are

assigned a load.

Referring to claim 3, Yu teaches in a communication system network having a plurality

of servers (Fig. 1, reference 54 of Yu), each of said plurality of servers having a load level based

on serving a number of clients in said communication system network (column 1, lines 10-11 of

Yu), a method comprising the steps of: grouping said plurality of servers into a plurality of

server groups G0 through Gk (column 4, lines 52-53 of Yu), wherein said server groups G0

through Gk respectively have load levels progressively from a least amount of load level to a

most amount of load level (column 3, lines 53-55 of Yu); calculating a time period T1 (column

3, line 1 of Yu); assigning load to a server selected from servers in said server group G0 from an

initial time until expiration of said time period T1 (column 2, lines 58-60 of Yu).

Yu does not teach of multiple time periods or how to assign load to a server during time

periods other than the initial time period. Smith teaches calculating a plurality of time periods T1

through Tk; assigning load, after expiration of each of said time periods T1 through Tk measured

form said initial time, to a server selected from servers in the server groups from G0 and at least

one other group selected from said server groups G1 through Gk (see column 14, lines 43-47 and

column 15, lines 15-18). Therefore, it would have been obvious to one having ordinary skill in

the art at the time the invention was made to further modify the method and apparatus for

dynamic interval-based load balancing of Yu by having multiple time periods and assigning load

to a server from each server group during each time period after the initial time period because to

implement load balancing there must be an interval of time for each additional server group

where all servers within that group are assigned a load.

Regarding claim 4, Yu teaches in a communication system network having a plurality of

servers (Fig. 1, reference 54 of Yu), each of said plurality of servers having a load level based on

serving a number of clients in said communication system network (column 1, lines 10-11 of

Yu), a method comprising the steps of: grouping said plurality of servers into a plurality of

server groups G0 through Gk (column 4, lines 52-53 of Yu), wherein said server groups G0

through Gk respectively have load levels progressively from a least amount of load level to a

most amount of load level (column 3, lines 53-55 of Yu); calculating a time period T1

corresponding to said server group G1 (column 3, line 1 of Yu); assigning load to a server

selected from servers in said server group G0 from an initial time until expiration of said time

period T1 (column 2, lines 58-60 of Yu).

Yu does not teach of multiple time periods corresponding to multiple server groups nor

how to assign load to a server during time periods other than the initial time period. Smith

teaches calculating a plurality of time periods T1 through Tk corresponding to said server groups

G1 through Gk; assigning load, after expiration of each of said time periods T1 through Tk

measured from said initial time, to a server selected from servers in a combination of servers

including said server group G0 and at least one other server group, in said server groups G1

through Gk, corresponding to an expiring time period (see column 14, lines 43-47 and column

15, lines 15-18). Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to further modify the method and apparatus for dynamic

interval-based load balancing of Yu by having multiple time periods that correspond to the server

groups and assigning load to a server selected from servers in a combination of servers including

said server group G0 and at least one other server group during each time period after the initial

time period because to implement load balancing there must be an interval of time for each

additional server group where all servers within that group are assigned a load this way the load

is distributed evenly over all servers within each server group.

Regarding claim 7, Yu teaches the method as recited in claim 4 wherein said grouping of

said plurality of server groups G0 through Gk is based on similarity of load levels among said

plurality of servers (column 3, lines 53-55 and column 4, lines 52-53 and column 5, lines 15-17 of Yu).

Referring to claim 8, Yu teaches the method as recited in claim 4 wherein at least one load assignment in said assigning load to a server in said server group G0 and said assigning load to a server selected from servers in said combination is performed according to around robin selection method (column 2, line 25-26 of Yu).

Regarding claim 10, Yu teaches the method as recited in claim 4 wherein each of said plurality of time periods T1 through Tk is based on load levels of at least two server groups selected from said plurality of server groups G0 through Gk, a request arrival rate and a server service rate (column 2, lines 12-14 and column 3, lines 18-21 and lines 34-36 of Yu).

Referring to claims 11 and 12, Yu teaches the method as recited in claim 10 wherein said request arrival rate is substituted for an average request arrival rate [of a combination of servers] of said plurality of servers (column 6, line 56 and column 7, lines 7-8 of Yu).

Regarding claims 13 and 14, Yu teaches the method as recited in claim 10 wherein said server service rate is substituted for an average service rate [of a combination of servers] of said plurality of servers (column 5, lines 55-56 and column 5, lines 66-67 through column 6, line 1 of Yu).

3.      Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,078,943 to Yu in view of Smith as applied to claims 1-4, 7, 8, and 10-14 above, and further in view of Adelman et al.

Regarding claim 5, Yu in view of Smith teaches of server groups (column 4, lines 52-53 of Yu) and time periods (column 3, line 1 of Yu).

Yu in view of Smith does not teach that the plurality of time periods T1 through Tk each

are based on a difference between load levels of at least two server groups. Adelman et al.

teaches the method as recited in claim 4 wherein said plurality of time periods T1 through Tk

each is based on a difference between load levels of at least two server groups in said plurality of

server groups G0 through Gk (column 8, lines 36-40). Therefore, it would have been obvious to

one having ordinary skill in the art at the time the invention was made to further the method and

apparatus for dynamic interval-based load balancing of Yu in view of Smith by having the time

periods be based on the difference between load levels of the server groups because the time

periods limit the amount of time to assign load to the servers of multiple server groups therefore

the time period needs to be longer for servers (from the higher end server groups) being assigned

a greater load and as the higher end server groups are included the load difference will increase

which will increase the time period.

4.      Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No.

6,078,943 to Yu in view of Smith as applied to claims 1-4, 7, 8, and 10-14 above, and further in

view of Attanasio et al. and Fine.

Referring to claim 6, Yu in view of Smith teaches of assigning loads to servers within a

server group for a designated time period (column 1, lines 11-12 and column 4, lines 52-53 and

column 5, line 1-3 of Yu).

Yu in view of Smith does not teach of receiving an update of the load level of the servers

and regrouping the servers, and reassigning the load based on this update. Attanasio et al. teaches

the method as recited in claim 4 further comprising the step of: receiving an update of load level

of at least one of said plurality of servers in said plurality of server groups G0 through Gk

(column 3, lines 46-48 of Attanasio et al.); repeating said grouping to produce a new plurality of

server groups G0 through Gk based on said update of load level (column 3, lines 60-62 of

Attanasio et al.); and assigning load to a server selected from servers in said new server group

G0 from said reset initial time until expiration of said new time period T1; assigning load, after

expiration of each of said new time periods T1 through Tk measured from said reset initial time,

to a server selected from servers in a combination of servers including said new server group G0

and at least one other server, in said new server groups G1 through Gk, corresponding to an

expiring time period (column 8, lines 25-27 of Attanasio et al.). Therefore, it would have been

obvious to one having ordinary skill in the art at the time the invention was made to further

modify the method and apparatus for dynamic interval-based load balancing of Yu in view of

Smith by receiving an update of the load level of the servers and regrouping the servers, and

reassigning the load based on this update because with this system there is a chance of an

imbalance of the load if servers within a server group are assigned a load greater than the load

threshold for that server group therefore a server load update and the repetition of grouping

servers and assigning load is needed to keep the load balanced within the system.

Yu in view of Smith and further in view of Attanasio et al. does not teach recalculating

the time periods and resetting the initial time. Fine teaches repeating said calculating said

plurality of time periods to produce a new plurality of time periods T1 through Tk corresponding

to said new plurality of server groups G0 through Gk; resetting said initial time to a reset initial

time (column 10, lines 1-2 and column 16, lines 25-27 of Fine). Therefore, it would have been

obvious to one having ordinary skill in the art at the time the invention was made to further

modify the method and apparatus for dynamic interval-based load balancing of Yu in view of

Smith by recalculating the time periods and resetting the initial time because with repetition of

grouping servers and assigning load a new set of time periods are needed because the time period

is related to the server group.

5.      Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No.

6,078,943 to Yu in view of Smith as applied to claims 1-4, 7, 8, and 10-14 above, and further in

view of Applicant Admitted Prior Art (AAPA).

Regarding claim 9, Yu in view of Smith teaches assigning load to a server in said server

group (column 1, lines 11-12 and column 4, lines 52-53 of Yu).

Yu in view of Smith does not teach of load assignment according to a random selection

method. AAPA teaches the method as recited in claim 4 wherein at least one load assignment in

said assigning load to a server in said server group G0 and said assigning load to a server

selected from servers in said combination is performed according to a random selection method

(pg.4, lines 8-10 and pg. 11, lines 10-11). Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to further modify the method and

apparatus for dynamic interval-based load balancing of Yu in view of Smith by assigning load to

the servers according to a random selection method because this helps to avoid the server groups

moving together as in the round robin method.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to April L Baugh whose telephone number is 703-305-5317. The examiner can normally be reached on Monday-Friday 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A Wiley can be reached on 703-308-5221. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-9149 for regular communications and 703-746-9149 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

ALB
January 22, 2003

DAVID WILEY
SUPERVISORY PATENT EXAMINER
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